




**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7**

11201 Renner Boulevard
Lenexa, Kansas 66219

FEB 26 2014

MEMORANDUM

SUBJECT: Surface Water and Fish Tissue Sampling Results, Rotary Drilling Supply Site, Crystal City, Missouri

FROM: Greg McCabe
ENSV/EAMB 

TO: Nicole Moran
AWMD/WEMM

We have completed our review of the results of surface water and fish tissue sampling efforts which took place in December 2014, at Willer's Lake, which is located adjacent to the Rotary Drilling Supply Site. To evaluate any potential human health threats from the ingestion of surface water, results were compared against EPA's health-based screening levels for tapwater, as shown in EPA's Regional Screening Table. This table can be found at http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm. The tap water values account for ingestion of drinking water, inhalation of volatiles released into the indoor air during household water use, and dermal contact while showering/bathing. They assume exposure to contaminated water for 350 days per year, for 30 years. Because the surface water in Willer's Lake is not used as a drinking water supply, the comparison of sample results with these screening levels is extremely conservative or health-protective.

Our review found that the only compound identified in surface water which exceeded EPA's health-based screening levels was lead. Surface water concentrations of lead ranged from 22.3 µg/l to 31.7 µg/l. These concentrations are above EPA's Maximum Contaminant Level (MCL) for lead in drinking water supplies of 15 µg/l. But again, Willer's Lake is not used as a drinking water supply.

Also, as you may know, the chromium data was not speciated between the trivalent form and the less common, and more toxic, hexavalent form due to the difficulty in securing analytical results for hexavalent chromium at detection limits which would be below EPA's health based screening levels. Instead, total chromium was analyzed. The total chromium drinking water MCL of 100 µg/l covers both trivalent (Cr^{+3}) and hexavalent (Cr^{+6}) chromium, though the most recent science suggesting that hexavalent chromium might have a carcinogenic component via the oral route of exposure is not addressed in the total chromium MCL. Total chromium was not found in Willer's Lake surface water at concentrations above a detection limit of 2 µg/l. This detection limit is well below EPA's drinking water MCL for total chromium of 100 µg/l, and EPA's screening level of 16,000 µg/l for trivalent chromium. This detection limit is also well below EPA's non-cancer screening value for hexavalent chromium of 31 µg/l, based on a Hazard Index (HI) = 1. However, EPA's Regional Screening Level (RSL) for hexavalent chromium based on a potential excess cancer risk of 1E-06 is 0.031 µg/l, assuming default residential exposure values. The following table shows the concentrations, detection limits, and screening levels for both lead and chromium in surface water. It should be noted that the reported results

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are for total, rather than dissolved metals. It would be reasonable to assume that the dissolved concentrations of metals in surface water would be lower than the concentrations for total metals.

Surface Water Results, $\mu\text{g/l}$

Compound	Maximum concentration	Detection limit	MCL	RSL at HI=1	RSL at 1E-06 cancer risk
lead	31.7	1.0	15	n/a	n/a
total chromium	not found	2.0	100	$\text{Cr}^{+3} = 16,000$ $\text{Cr}^{+6} = 31$	$\text{Cr}^{+6} = 0.031$

With respect to the consumption of fish caught in Willer's Lake, we compared the fish tissue sampling results with the EPA Region 3 health-based screening levels for the consumption of fish tissue. These screening levels can be found at <http://www.epa.gov/reg3hwmd/risk/human/>. These same screening levels can also now be developed using the calculator function found on EPA's Regional Screening Table website.

No contaminants were identified in fish tissue at concentrations which exceed EPA's health-based screening values. However, there were several contaminants whose detection limits exceeded EPA's health-based screening levels. The detection limit of 0.72 mg/kg for antimony slightly exceeded the noncancer health-based screening level 0.54 mg/kg, at a HI=1. Similarly, the detection limit of 0.21 mg/kg for thallium exceeded its noncancer screening value of 0.014 mg/kg. As with surface water, fish tissue samples were not analyzed specifically for hexavalent chromium. Still, the detection limit for trivalent chromium was far below the noncancer health-based screening value, while the detection limit for hexavalent chromium was below the screening level for noncancer health effects. The detection limit of 0.09 mg/kg was above the 1E-06 potential excess cancer risk screening level of 0.0063 mg/kg for hexavalent chromium.

Fish Tissue Results, mg/kg

Compound	Maximum concentration	Detection limit	RSL at HI=1	RSL at 1E-06 cancer risk
antimony	not found	0.72	0.54	n/a
thallium	not found	0.21	0.014	n/a
chromium	not found	0.09	$\text{Cr}^{+3} = 2,000$; $\text{Cr}^{+6} = 4.1$	0.0063

Please feel free to contact me at x7709 if you have any questions regarding our review.

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AWMD / WEMM

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DATE	2/26/14	02/28/14		
INITIALS	gmm	hob		

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